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EXAMINER

HOPKINS, ROBERT A

ART UNIT

PAPER NUMBER

1724

5

DATE MAILED: 03/27/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

10/087,917

Applicant(s)

GRAFF ET AL.

Examiner

Robert A Hopkins

Art Unit

1724

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☐ Claim(s) 1-40 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) 5-25 is/are allowed.
- 6) ☐ Claim(s) 1-4, 26, 27, 29-33 and 36-40 is/are rejected.
- 7) ☐ Claim(s) 28 and 34 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

## Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_
- 4) ☐ Interview Summary (PTO-413) Paper No(s) \_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

## **DETAILED ACTION**

### ***Claim Objections***

Claim 26 is objected to because of the following informalities: Examiner respectfully requests applicant change "The method" in line 1 to – A method—for congruency with the other preamble claims. Appropriate correction is requested.

### ***Specification***

The amendment filed 6-11-02 is objected to under 35 U.S.C. 132 because it introduces new matter into the disclosure. 35 U.S.C. 132 states that no amendment shall introduce new matter into the disclosure of the invention. The added material which is not supported by the original disclosure is as follows: the amendment states that the feed gas may consist of a mixture of methane, CO<sub>2</sub>, and any other gas species, wherein the gas to be separated from CO<sub>2</sub> is lighter than CO<sub>2</sub>, such as hydrogen. Examiner notes that the specification only recites that methane is lighter than CO<sub>2</sub>, and that only methane is separated from CO<sub>2</sub>. Examiner notes that while it is true that the specification recites that the feed gas may consist of a mixture of methane, CO<sub>2</sub>, and any other gas species, the other gas species are all higher in molecular weight than CO<sub>2</sub>. Examiner also notes that the application of the invention is to separation of methane from carbon dioxide in a natural gas, and therefore hydrogen does not seem to be a constituent of a natural gas stream.

Applicant is required to cancel the new matter in the reply to this Office Action.

***Claim Rejections - 35 USC § 112***

Claims 36 and 40 are rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

Claim 36 line 3 recites "a gas or gases lighter than carbon dioxide". Examiner notes that there is insufficient enablement for "a gas or gases lighter than carbon dioxide". Examiner notes that there are many gases having a molecular weight lighter than carbon dioxide, however only methane and hydrogen are disclosed in the present specification. Correction is requested.

Claim 40 lines 5-6 recites "methane and any other gas lighter than carbon dioxide". Examiner notes that there is insufficient enablement for "any other gas lighter than carbon dioxide". Examiner notes that there are many gases having a molecular weight lighter than carbon dioxide, however claim 37 recites the lighter gas stream consists of a hydrogen content gas, of which only methane and hydrogen are disclosed in the present specification. Correction is requested.

Claims 36-40 are rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. As noted in the specification section of the current office action, the amendment to the specification

states that the feed gas may consist of a mixture of methane, CO<sub>2</sub>, and any other gas species, wherein the gas to be separated from CO<sub>2</sub> is lighter than CO<sub>2</sub>, such as hydrogen. Examiner notes that the specification only recites that methane is lighter than CO<sub>2</sub>, and that only methane is separated from CO<sub>2</sub>. Examiner notes that while it is true that the specification recites that the feed gas may consist of a mixture of methane, CO<sub>2</sub>, and any other gas species, the other gas species are all higher in molecular weight than CO<sub>2</sub>. Therefore, claims 36-40 introduce new matter by reciting that the lighter gas stream is a hydrogen containing gas or a hydrogen content gas. Applicant is required to cancel the new matter in the reply to this Office Action.

Claim 33 is rejected under 35 U.S.C. 112, first paragraph, as based on a disclosure which is not enabling. A step for separated a liquid from a gas is critical or essential to the practice of the invention, but not included in the claim is not enabled by the disclosure. See *In re Mayhew*, 527 F.2d 1229, 188 USPQ 356 (CCPA 1976). Examiner notes claim 33 recites "a centrifugal means to process said a) gas thereby to separate heavy gases from light gases", however such a "centrifugal means" is in series with a centrifugal separator for separating liquid from a saturated gas. Examiner notes that therefore a step of including a centrifugal means to separate a liquid from a saturated gas is missing in claim 33. Examiner also notes that inclusion of a step in claim 33 would provide for identical claim limitations as claim 29, and hence would lead to a possible double patenting situation. Correction is requested. Claim 34 depends on claim 33 and hence is also rejected.

Claims 29-31 and 33 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 29 line 7 and claim 31 line 7 recites "from said a) gas". Examiner is unclear as to what is meant by "a) gas". Examiner notes in figure 6 that a saturated gas stream is output from a three phase rotary separator. Therefore examiner suggests substituting –from a saturated gas separated in step a) – for "from said a) gas" for greater clarity. Claim 30 depends on claim 29 and hence is also rejected.

Claim 29 lines 10-11 recites "process said a) gas". Examiner is unclear as to what is meant by "a) gas". Examiner also notes that a centrifugal means to separate heavy gases from light gases operates on the dry gas mixture separated from the saturated gas, and not directly on the saturated gas. Correction is requested.

Claim 33 lines 6-7 recites "process said a) gas". Examiner is unclear as to what is meant by "a) gas". Examiner also notes that a centrifugal means to separate heavy gases from light gases operates on the dry gas mixture separated from the saturated gas, and not directly on the saturated gas. Correction is requested.

### ***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claim 1 is rejected under 35 U.S.C. 102(b) as being clearly anticipated by German reference(10015546A1).

German reference teaches a gas centrifuge means(see figure 1) operating to separate gases of differing chemical composition and molecular weight(N<sub>2</sub> and CO<sub>2</sub>) by a centrifugal force field.

Claim 2 is rejected under 35 U.S.C. 102(b) as being clearly anticipated by German reference(10015546A1).

German reference teaches a gas centrifuge means(see figure 1) operating to separate carbon dioxide from methane by a centrifugal force field. Examiner notes that the gases being worked on by the gas centrifuge are not given patentable weight. Examiner notes that the claim is directed to a gas centrifuge structure.

Claims 26 and 27 are rejected under 35 U.S.C. 102(b) as being clearly anticipated by German reference(10015546A1).

German reference teaches a method including providing a rotary centrifuge to receive a mixture of gases, operating the rotary centrifuge to separate the components into separate streams, and using the separated streams to produce torque to aid in rotation of the centrifuge. Examiner notes that reciting carbon dioxide and/or other heavy gases and methane components is an intended use for the rotary centrifuge and is not given patentable weight. German reference further teaches using the mixture received by the centrifuge as a flowing stream to produce torque acting to aid rotation of the centrifuge.

Claim 36 is rejected under 35 U.S.C. 102(b) as being clearly anticipated by German reference(10015546A1).

German reference teaches a gas centrifuge means(see figure 1) operating to separate carbon dioxide from a gas lighter than carbon dioxide. Examiner notes that the gases being worked on by the gas centrifuge are not given patentable weight. Examiner notes that the claim is directed to a gas centrifuge structure.

Claim 1 is rejected under 35 U.S.C. 102(b) as being clearly anticipated by Ruhemann et al(3643452).

Ruhemann et al teaches a gas centrifuge means(58) operating to separate gases of differing chemical composition and molecular weight(He and N<sub>2</sub>) by a centrifugal force field.

Claim 2 is rejected under 35 U.S.C. 102(b) as being clearly anticipated by Ruhemann et al(3643452).

Ruhemann et al teaches a gas centrifuge means(58) operating to separate carbon dioxide from methane by a centrifugal force field. Examiner notes that the gases being worked on by the gas centrifuge are not given patentable weight. Examiner notes that the claim is directed to a gas centrifuge structure.

Claim 32 is rejected under 35 U.S.C. 102(b) as being clearly anticipated by Ruhemann et al(3643452).

Ruhemann et al discloses a centrifugal gas processing system comprising a centrifugal means(53) to extract liquids from gas by lowering the pressure and



temperature and separating the formed liquids from the gas, and a centrifugal means(58) to process the gas thereby to separate heavy gases from light gases.

Claim 35 is rejected under 35 U.S.C. 102(b) as being clearly anticipated by Ririe(3643406).

Ririe teaches a gas processing system comprising a centrifugal means(2) to extract liquids from gas by lowering the pressure and temperature and separating the formed liquids from the gas, and means(16) to inject a treatment liquid into the system for purposes of gas treatment.

Claim 36 is rejected under 35 U.S.C. 102(b) as being clearly anticipated by Ruhemann et al(3643452).

Ruhemann et al teaches a gas centrifuge means(58) operating to separate carbon dioxide from a gas lighter than carbon dioxide. Examiner notes that the gases being worked on by the gas centrifuge are not given patentable weight. Examiner notes that the claim is directed to a gas centrifuge structure.

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) and the Intellectual Property and High Technology Technical Amendments Act of 2002 do not apply when the reference is a U.S. patent resulting directly or indirectly from an international application filed before November 29, 2000. Therefore, the prior art date of the reference is determined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

Claim 1 is rejected under 35 U.S.C. 102(e) as being clearly anticipated by Pletschacher(6363923).

Pletschacher teaches a gas centrifuge means(1) operating to separate gases of differing chemical composition and molecular weight(N<sub>2</sub> and O<sub>2</sub>) by a centrifugal force field.

Claim 2 is rejected under 35 U.S.C. 102(e) as being clearly anticipated by Pletschacher(6363923).

Pletschacher teaches a gas centrifuge means(1) operating to separate carbon dioxide from methane by a centrifugal force field. Examiner notes that the gases being worked on by the gas centrifuge are not given patentable weight. Examiner notes that the claim is directed to a gas centrifuge structure.

Claim 36 is rejected under 35 U.S.C. 102(e) as being clearly anticipated by Pletschacher(6363923).

Pletschacher teaches a gas centrifuge means(1) operating to separate carbon dioxide from a gas lighter than carbon dioxide. Examiner notes that the gases being worked on by the gas centrifuge are not given patentable weight. Examiner notes that the claim is directed to a gas centrifuge structure.

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 3 and 4 are rejected under 35 U.S.C. 103(a) as being unpatentable over any one of German reference(10015546A1) or Ruhemann et al(3643452) or Pletschacher(6363923) taken together with Wikdahl(4092130).

German reference and Ruhemann et al and Pletschacher disclose all of the limitations of claim 3 but is silent as to a multiplicity of centrifuge means as defined in claim 1, arranged such the separated gases are further concentrated by introducing them into successive of the gas centrifuge means. Wikdahl discloses a cone-shaped vortex structure for separating gas mixtures into components according to molecular weight, wherein the vortex structure is arranged as a multiplicity of vortex structures , wherein the separated gases are further concentrated by introducing them into successive of the vortex structures(see figure 3). It would have been obvious to someone of ordinary skill in the art at the time of the invention to provide a multiplicity of centrifuge means for the single gas centrifuge of German reference and Ruhemann et al and Pletschacher in order to repeat the separation process for gas components close in molecular or atomic weight(column 3 lines 3-8 of Wikdahl).

Claim 31 is rejected under 35 U.S.C. 103(a) as being unpatentable over Aslin(6348087).

Aslin discloses a centrifugal gas processing system comprising a centrifugal means(1) to separate free liquids from gas, light liquids from heavy liquids, and solids from liquids, and a means(105) to extract liquids from saturated gas of the centrifugal means. Aslin is silent as to wherein the means to extract liquids from a saturated gas is a centrifugal means. Examiner respectfully submits that centrifugal separators are well

known for separating gas streams entrained with liquid, therefore it would have been obvious to someone of ordinary skill in the art at the time of the invention to substitute a centrifugal separator for the mist eliminator of Aslin in order to provide for a higher efficiency separation of the liquid from the gas.

***Allowable Subject Matter***

Claims 5-25 are allowed.

The following is a statement of reasons for the indication of allowable subject matter:

Claim 5 recites "a hollow shaft to pass and introduce a gas mixture into a rotating cylinder, ... , an opening in the hollow shaft to receive and remove a produced and concentrated lighter gas stream from the cylinder". Pletschacher(6363923) discloses a gas centrifuge, however Pletschacher fails to disclose a hollow shaft to pass and introduce a gas mixture into a rotating cylinder and an opening in the hollow shaft to receive and remove a produced and concentrated lighter gas stream from the cylinder. Pletschacher discloses openings along an end wall of the cylinder for removing the concentrated lighter gas stream. It would not have been obvious to someone of ordinary skill in the art at the time of the invention to provide a hollow shaft with an opening in the hollow shaft to receive and remove a produced and concentrated lighter gas stream from the cylinder because Pletschacher does not suggest such a modification. Claims 8,11,14,17, 23 depend on claim 5 and hence are also allowed.

Claim 6 recites "an open scoop oriented perpendicular to the direction of rotation operating to remove a produced and concentrated lighter gas from the cylinder, and a passage contoured and operating to recover the velocity head of the concentrated lighter gas as pressure". Pletschacher(6363923) discloses a gas centrifuge, however Pletschacher fails to disclose an open scoop oriented perpendicular to the direction of rotation operating to remove a produced and concentrated lighter gas from the cylinder, and a passage contoured and operating to recover the velocity head of the concentrated lighter gas as pressure. Pletschacher discloses openings along an end wall of the cylinder for removing the concentrated lighter gas stream. It would not have been obvious to someone of ordinary skill in the art at the time of the invention to provide an open scoop oriented perpendicular to the direction of rotation operating to remove a produced and concentrated lighter gas from the cylinder, and a passage contoured and operating to recover the velocity head of the concentrated lighter gas as pressure because Pletschacher does not suggest such a modification. Claims 9,12,15,18,20-22, 24 depend on claim 6 and hence are also allowed.

Claim 7 recites "a second radial passage connected to the periphery of the cylinder operating to pressurize a produced and concentrated lighter gas stream, a third nozzle connected to the second passage and operating to convert the pressure of the lighter gas stream to velocity adding torque to the cylinder". Pletschacher(6363923) discloses a gas centrifuge, however Pletschacher fails to disclose a second radial passage connected to the periphery of the cylinder operating to pressurize a produced and concentrated lighter gas stream, a third nozzle connected to the second passage

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and operating to convert the pressure of the lighter gas stream to velocity adding torque to the cylinder. Pletschacher discloses openings along an end wall of the cylinder for removing the concentrated lighter gas stream. It would not have been obvious to someone of ordinary skill in the art at the time of the invention to provide a second radial passage connected to the periphery of the cylinder operating to pressurize a produced and concentrated lighter gas stream, a third nozzle connected to the second passage and operating to convert the pressure of the lighter gas stream to velocity adding torque to the cylinder because Pletschacher does not suggest such a modification. Claims 10,13,16,19, 25 depend on claim 7 and hence are also allowed.

Claims 28 and 34 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Claim 28 recites "including providing vanes in the centrifuge to receive and pass the flowing stream, with turbine effect". German reference discloses a rotor, however the rotor is a plate-like cylindrical rotor without vanes. It would not have been obvious to someone of ordinary skill in the art at the time of the invention to provide vanes in the centrifuge of German reference because German reference does not suggest such a modification.

Claim 34 recites "together with means to inject a treatment liquid into said system for purposes of gas treatment". Ruhemann et al fails to disclose a means to inject a treatment liquid into the centrifugal gas processing system for purposes of gas

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treatment. It would not have been obvious to someone of ordinary skill in the art at the time of the invention to provide a means to inject a treatment liquid into the centrifugal gas processing system because Ruhemann et al does not suggest such a modification.

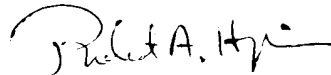
The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

McGuire(US 2002/0189443) discloses a static centrifugal separator for separating methane from carbon dioxide and other heavy hydrocarbon compounds of a natural gas stream.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Robert A Hopkins whose telephone number is 703-308-3913. The examiner can normally be reached on Monday-Friday 9:00am-3:00pm, alternate Fridays off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tom Dunn can be reached on 703-308-3318. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9310 for regular communications and 703-872-9572 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0661.

  
Robert A Hopkins  
Primary Examiner  
Art Unit 1724

rah  
March 20, 2003